

PRELIMINARY REPORT ON THE HISTOLOGICAL
STRUCTURE OF THE DORSAL PAPILLÆ OF
CERTAIN SPECIES OF ONCHIDIUM.

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The structure of the tubercles was studied by means of section series, through specimens of *Onchidium chameleon*, Brazier, described above, and *Onchidium Dämелиi*, Semper. The specimens were collected by Mr. Whitelegge in Port Jackson, hardened with osmic acid and stained in various ways.

The results of this investigation are the following :—

1. *Onchidium chameleon* has small papillæ and has no eyes, *O. Dämелиi* has generally three large eyes on each papilla, these are situated laterally.

2. My investigations carried on with excellent material, corroborate the descriptions given by Semper (1) of the eyes of *Onchidia* perfectly.

3. The eyes of *Onchidium Dämелиi* belong to Semper's group I., eyes with an epithelial retina.

4. The epithelium of the tubercles is of identical structure in the species with, and the species without, dorsal eyes, and formed

(1) *C. Semper*. Ueber Sehorgane von dem Typus der Wirbelthieraugen auf dem Rücken von Schnecken—Reisen im Archipel der Philippinen Zweiter Theil.

of an outer layer of low cylinder cells, between which there are slender sensitive cells, particularly abundant round the eyes or on the sides of the tubercles (blind species.)

5. The otolith-like concretions in the numerous vesicles of the dorsal skin are composed of carbonate of lime and homologous to parts of the shell of other related pulmonates.

6. The eyes multiply by division, semi-detached eyes, and such with a simple spherical pigment layer, but with two lenses are not rare.

7. The lens consists apparently of one single cell which retains its nucleus and vitality, and may divide into two. A sphincter-shaped circular accommodation muscle is clearly visible.

8. The retina is of a much more complicated nature than Semper, who only had spirit specimens at his disposal, was able to discover. The radiating fibres of the nervus opticus are interspersed with small ganglia cells. Below these follow cells with peculiar plano-concave bodies in them, which are highly refractive. These cells are broad and cylindrical. The final branches of the Opticus extend downward between them to a layer of multipolar cells below. Below this layer of granular (osmic acid) ganglia cells, cylindrical and very regular hexagonal cells are found; the axis of each is situated in the direction of the entering light. These hexagonal cells are attached to the pigment-skin at the outer limit of the retina. Pigment granules extend up the sides of the partition walls of these hexagonal cells for some distance. The walls themselves are thickened below, and in this way concave spaces are formed, one at the bottom of each hexagonal cell. These spaces are completely surrounded by pigment.

In the centre of each, a rod (Stäbchen) is situated. This has a conical shape, is attached with a broad base to the bottom of the concave space, and tapers rapidly at first and more gradually afterwards, to a fine point. Its faces appear concave. The upper pointed end of the rod is continued in the shape of a very fine thread extending through the centre of the hexagonal cell and joining the ganglia cell-layer.



9. Nothing is to be added to Semper's statements regarding the nervi optici.

10. It is remarkable that the *Onchidium Dämeli* never retracts her tubercles or feelers, however near the forceps or scissors approach them until they are actually in contact. This might lead one to assume that this animal is farsighted.

11. The concave lenses on the upper ends of the facets, below the large spherical main lens, appear as a secondary arrangement produced for the purpose of counteracting the bad effect of an oval or spherical lens in air.

The lens was originally, probably, adapted for seeing in water, and therefore had such a great curvature and short focus. When the *Onchidium* took to living on land this lens was too strong—for use in air—and then the little concave cells might have been produced to counteract the excessive power of the main lens.